

Abstract Submitted  
for the DAMOP19 Meeting of  
The American Physical Society

**The Upcoming JILA Gen. III eEDM Experiment** KIA BOON NG, YAN ZHOU, WILLIAM CAIRNCROSS, TANYA ROUSSY, TANNER GROGAN, YUVAL SHAGAM, KEVIN BOYCE, ANTONIO VIGIL, MADELINE PETTINE, JUN YE, ERIC CORNELL, University of Colorado, Boulder — ThF<sup>+</sup> is the champion for the third-generation (Gen. III) measurement of the electric dipole moment of the electron (eEDM) at JILA. Compared to the current HfF<sup>+</sup> eEDM experiment, ThF<sup>+</sup> has several advantages: (i) the eEDM-sensitive state (<sup>3</sup>Δ<sub>1</sub>) is the ground state [1,2], with a projected coherence time on the order of a few minutes; and (ii) its effective electric field (38 GV/cm) is 50% larger than that of HfF<sup>+</sup> [3], which promises a direct increase of the eEDM sensitivity. Herein, we present the final spectroscopic work on the <sup>3</sup>Δ<sub>1</sub> state, and discuss multiplexing strategies to increase our effective count rate in Gen. III by two orders of magnitude over the Gen. II experiment.

1. Gresh, Daniel N., et al. “Broadband velocity modulation spectroscopy of ThF+ for use in a measurement of the electron electric dipole moment.” *Journal of Molecular Spectroscopy* 319 (2016): 1-9.
2. Zhou, Yan, et al. “Visible and ultraviolet laser spectroscopy of ThF.” arXiv:1901.06084 (2019)
3. Skripnikov, L. V., and A. V. Titov. “Theoretical study of ThF+ in the search for T, P-violation effects: Effective state of a Th atom in ThF+ and ThO compounds.” *Physical Review A* 91.4 (2015): 042504.

Kia Boon Ng  
University of Colorado, Boulder

Date submitted: 03 May 2019

Electronic form version 1.4